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A lintel, a lintel side plate and a method of forming a lintel

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ABSTRACT

A lintel side plate, a lintel and a method of forming a lintel are disclosed. The lintel side plate has a planar plate body (40) having first and second punch teeth (46) which are spaced apart from one another. A flange (43) extends from the plate body (40) transverse with respect to the plate body (40). The lintel side plate is connected to the top plate (12) and header plate (22) of a building frame with the flanges (43) forming stiffening elements between the top plate (12) and header plate (22). In other embodiments instead of using flanges (43) studs (32) may be interposed between the top plate (12) and header plate (22).

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COMPLETE SPECIFICATION
STANDARD PATENT

Applicant(s):

MITEK HOLDINGS, INC.

Invention Title:

A LINTEL, A LINTEL SIDE PLATE AND A METHOD OF FORMING A LINTEL.

The following statement is a full description of this invention, including the best method of performing it known to me/us:

A LINTEL, A LINTEL SIDE PLATE AND A METHOD OF FORMING A
LINTEL.

5 This invention relates to a lintel, a lintel side plate and
a method of forming a lintel.

Lintels are typically used as structural framing members
over windows and doors, and skirters to support roof and
floor trussers, and in other residential, industrial,
10 commercial and agricultural applications. Generally,
lintels span the distance between two space supports and
carry structure loads, eg. the weight of the structure
above the lintel.

15 Conventional lintels are used in Australia generally formed
from solid large section timber on cold formed or hot
rolled steel beams.

Conventional lintels of the type referred to above
20 generally have far more capacity and utilise far more
materials than necessary for most applications in which
they are used. Furthermore, such lintels are heavy to
carry, and labour-intensive to install.

25 Another known type of lintel is made partly of wood and
partly of steel and is marketed under the trade name
TRIFOLD. These lintels include a shaped steel member
having a centre web portion and integral flanges that
extend in the same direction from opposing side edges of
30 the web portion. The metal webs are secured between top
and bottom chords with one flange of the metal web extends
over the top surface of a frame member and the other flange
extends over the bottom surface of the frame.

35 The invention provides a timber frame construction,
including;

(a) a top plate and a header plate, located



above an opening in the frame construction;

(b) a lintel having

(i) a top chord formed by the top plate and a bottom chord formed by the header plate;

5 (ii) a plurality of separate lintel side plates formed from metal and each having a substantially planar plate body, the lintel side plates extending along the lintel between one end of the lintel and the other end of the lintel;

10 (iii) a first grouping of connection elements for connecting each plate body to the top chord;

(iv) a second grouping of connection elements spaced from the first grouping, for connecting each plate body to the bottom chord; and

15 (v) a plurality of stiffenings between the top chord and the bottom chord.

20 This aspect of the invention enables a lintel to be formed on site by using conventional framing members, together with the addition of lintel side plates to complete the formed lintel. The formation of the lintel in this manner does away with the need for an additional top chord and bottom chord of a prefabricated lintel thereby reducing the amount of material in the lintel and frame in which the
25 lintel is installed.

30 In one embodiment of the invention the lintel side plate may each have an integral flange, each flange forming a stiffening between the top chord and bottom chord of the formed lintel.

35 However, in other embodiments frame studs may be secured in place between the top and header plates, and the lintel side plate may comprise a substantially planar plate body.

The plate body preferably includes first and second groupings of connection elements which may be formed in a



manner described above.

In one embodiment of the invention the first and second groupings are located respectively adjacent first and second opposed sides of the substantially planar plate body.

In one embodiment the first and second groupings of connection elements comprise TYLOCK (trade mark) type punched teeth, punched from and extending from the substantially planar plate body.

However, in other embodiments the connection elements could comprise punched teeth of other configurations or simply holes through the planar plate body for receiving nails to secure the lintel side plate to the top and bottom chords. In this aspect of the invention the lintel is effectively formed on site and the top plate and header plate comprise the top chord and bottom chord of the formed lintel.

The invention may also provide a method of forming a lintel in a framing construction including:

constructing a building frame having a top plate and a header plate located above an opening in the constructed frame;

locating a plurality of separate lintel side plates, each having a substantially flat plate body, between the top and header plates and connecting the lintel side plates to the top and header plates, so the lintel side plates extend along the lintel between one end of the lintel and the other end of the lintel;

wherein the top and header plates of the formed frame comprise the top chord and bottom chord of the formed lintel; and

locating stiffenings between the top chord and bottom chord of the lintel.



In one embodiment of the invention the lintel each side plate may include a flange, the flanges forming stiffenings between the top chord and bottom chord of the formed lintel.

5

However, in other embodiments frame studs may be secured in place between the top and header plates, and the lintel side plate may comprise a substantially planar plate body.

- 10 The plate body preferably includes first and second groupings of connection elements which may be formed in a manner described above.

One embodiment uses a lintel side plate having a planar plate body extending between and overlapping the top chord and the bottom chord, and the plurality of lintel side plates extending along the lintel from one end of the lintel to the other end of the lintel;

each lintel side plate having an integral flange extending from a side edge of the planar plate body transverse to the planar plate body and extending, the integral flange being dimensioned to extend between the top and bottom chords for forming stiffenings between the top and bottom chords; and

each lintel side plate having a first grouping of connection elements for connecting the lintel side plates to the top chord, and a second grouping of connection elements spaced from the first grouping of connection elements, for connecting the side plates to the bottom chord.

Preferred embodiments of the invention will be described, by way of example, with reference to the accompanying drawings in which;

35



Figure 1 shows a building frame including a lintel according to one embodiment of the invention;

Figure 2 is a front view of a lintel side plate used in the embodiment of Figure 1;

5 Figure 3 is a perspective view of a lintel side plate according to a second embodiment of the invention;

Figure 4 is a plan view of the lintel side plate of Figure 3;

10 Figure 5 is a front view of a lintel including the lintel side plates of Figures 3 and 4;

Figure 6 is a view along the line VI-VI of Figure 5;

15 Figure 7 is a cross-sectional view similar to Figure 6 of a lintel according to a further embodiment of the invention'

Figure 8 is a cross-sectional view similar to Figure 7 of a lintel according to a still further embodiment of the invention.

20 With reference to Figure 1 a building frame 10 is shown which comprises a top plate 12 and a plurality of studs 14 which extend between the top plate 12 and a bottom plate 16. A window opening 20 is formed in the frame 10 below a header plate 22 and a sill plate 24. Studs 21 extend
25 between the sill plate 24 and the bottom plate 16. A lintel 30 is formed above the opening 20 and includes the top plate 12 and header plate 22 which effectively will form the top chord and bottom chord of the lintel 30. The lintel 30 also includes a number of vertical studs 32
30 extending between the top plate 12 and header plate 22. The studs 32 will form stiffenings of the lintel 30 when the lintel is completed.

35 All of the framing components referred to above are formed from timber as is conventional.

The lintel 30 is completed by a plurality of lintel plates

40 shown in dotted lines in Figure 1 which are secured to the top chord 12 and bottom chord 22 to complete the lintel 30.

5 Figure 2 shows a view of the lintel plates 40 used in Figure 1. The lintel plates 40 comprise a generally planar plate formed from metal having an upper edge 42 and a lower edge 44. The plates may include gussets, folds or the like for adding strength to the plates 40. Teeth 46 are punched
10 from the plates in two groupings adjacent to respective sides 42 and 44. The teeth 46 are preferably of TYLOCK configuration so that they can be easily hammered to penetrate into the top chord 12 and bottom chord 22 to secure the plates 40 between the top chords 12 and 22.
15 However, punched teeth of other configurations could also be used. In an alternative embodiments the punched teeth could be omitted and openings could merely be formed in the plates 40 to receive nails to secure the plates 40 to the top chord 12 and bottom chord 22.

20 The length of the plates L shown in Figure 2 are preferably dimension to suit stud spacings having 450 mm centres or 600 mm centres. The plates having lengths L to suit 450 mm or 600 mm stud centres can have varying depths D to suit
25 various lintel depths. Typically plates 40 of 450 mm or 600 mm centres could be made in two or three different depths D to suit lintel depths of different sizes.

30 Top edge 42 of the plates 40 are preferably flushed with a top edge of the top chord 12 but bottom edge 44 does not extend completely to the bottom of bottom chord 22, so that the plates 40 are positioned spaced from the bottom edge of the bottom chord 22. This spacing provides for convenient attachment of sidings or other materials to the bottom
35 chord 22 without interference by the plates 40. This preferred aspect of the invention is fully disclosed in our co-pending patent application No.86112/98 (the contents of

which is incorporated into this specification by this reference).

As disclosed in the above mentioned co-pending application
5 a third grouping of connection elements (not shown) could
be provided between the first and second groupings 46
generally centrally of the plates 40.

Figure 3 shows a further embodiment of the invention in
10 which side plate 40' is provided with a flange 43 which
extends transverse to the plane of the plate 40' and
preferably perpendicular to the plane of the plate 40'.
Like reference numerals in Figure 3 show like parts to
those previously described. The flange 43 extends from one
15 side edge 45 and is preferably formed integral with the
plate 40' and bent at right angles. The flange 43 extends
only part of the length of the side 45 between the first
and second groupings of connectors 46.

20 Figures 5 and 6 show a lintel formed from the side plates
40'.

In this embodiment the flanges 43 locate between the top
chord 12 and bottom chord 22 and form vertical stiffenings
25 between the top chord 12 and bottom chord 22 thereby
avoiding the need to insert wooden studs (such as the studs
32) shown in the embodiment of Figure 1. Preferably top
edge 43a of the flange 43 and bottom edge 43b of the flange
43 contact the bottom of top plate 12 and the top of header
30 plate 22 respectively so as to bear some of the load
exerted by the weight of the formed lintel.

Once again, the lintel of Figures 3 to 6 is formed by
constructing the frame of the building having the top plate
35 12 and header plate 22 above an opening 20 (see Figure 1)
but omitting the studs 32, and then attaching the side
plates 40' to the top chords 12 and bottom chord 22 with

the flange 43 extending between the top chord 12 and bottom chord 22 to form the vertical stiffenings of the formed lintel 30' shown in Figure 5.

5 Figure 7 shows a modification to the embodiment of Figure 1 in which the length of the window opening is not equal to the integral number of the plates 40. In this embodiment one of the plates (labelled 40a) can be secured to rear of the lintel and overlap one of the plates 40 on the other
10 side of the lintel 30.

Figure 8 shows an embodiment similar to Figure 7 but using the plates 40' of Figures 3 and 4. In this embodiment one of the plates 40'a is located on the rear surface of the
15 lintel 30' and overlaps one of the lintels 40' on the other side of the lintel 30'.

As disclosed in the above mentioned co-pending application, spaces could be provided between some of the lintel plates
20 40 and 40' to provide room for electrical, plumbing or other members without the need for drilling or cutting of the lintel.

In other embodiments of the invention the side plates 40' may include a flange (not shown) extending from side edge 49 (see Figure 3) so that each plate 40' has two flanges for location between the top chord 12 and bottom chord 22 of the lintel 30'. In the embodiment shown the flange 43 extends substantially the entire width of the chord 22.
25 However, the flange 43 could extend only part of the width of the chord 22.
30

Since modifications within the spirit and scope of the invention may readily be effected by persons skilled within
35 the art, it is to be understood that this invention is not limited to the particular embodiments described by way of example hereinabove.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A timber frame construction, including;
 - (a) a top plate and a header plate, located
5 above an opening in the frame construction;
 - (b) a lintel having
 - (i) a top chord formed by the top plate and a
bottom chord formed by the header plate;
 - (ii) a plurality of separate lintel side plates
10 formed from metal and each having a substantially planar
plate body, the lintel side plates extending along the
lintel between one end of the lintel and the other end of
the lintel;
 - (iii) a first grouping of connection elements
15 for connecting each plate body to the top chord;
 - (iv) a second grouping of connection elements
spaced from the first grouping, for connecting each plate
body to the bottom chord; and
 - (v) a plurality of stiffenings between the top
20 chord and the bottom chord.
2. The frame construction of claim 1 wherein the
first and second groupings are located respectively
adjacent first and second opposed sides of each
25 substantially planar plate body.
3. The frame construction of claim 1 wherein the
first and second groupings of connection elements comprise
punched teeth, punched from and extending from each
30 substantially planar plate body.
4. The frame construction of claim 1 wherein the
connection elements comprise holes through the planar plate
body for receiving nails to secure each lintel side plate
35 to the top and bottom chords.
5. The frame construction of claim 3 or 4 wherein



the stiffenings are formed from wood.

6. The frame construction of claim 2 wherein each
5 lintel side plate has an integral flange which extends from
a side edge of the planar plate body, each flange extending
for only part of the length of the side edge so that the
flanges can locate between the top chord and bottom chord
of the lintel with the substantially planar plate body
overlapping the top chord and bottom chord of the lintel,
10 each flange forming a stiffening of the plurality of
stiffenings.

7. A frame construction according to any one of
claims 1 to 6 further including;
15 a first vertical stud and a second vertical stud,
the header plate extending between the first and second
vertical studs; and
at least one said side plate body extending
beyond an end edge of the bottom chord so that a portion of
20 said side plate body overlaps the first vertical stud.

8. The timber frame constructions of claim 7 wherein
a first lintel side plate, of said plurality of lintel side
plates, is located at one end of the lintel, and a second
25 lintel side plate, of said plurality of lintel side plates,
is located at the other end of the lintel, the first and
second lintel side plates extending beyond respective edges
of the bottom chord of the lintel so that a portion of the
first and second lintel side plates will overlap the
30 respective first and second vertical studs so that portions
of the first and second vertical studs form stiffenings at
said one end and said other end of the lintel.

9. The timber framing construction of claim 8
35 wherein the portion of the first and second lintel side
plates, which extend beyond the ends of the bottom chord,
include some of said first and second groupings of



connection elements for connecting the first and second lintel side plates to the first and second vertical studs.

10. The framing construction according to any one of
5 the preceding claims wherein all of said lintel side plates are arranged on one side of said lintel.

11. The framing construction according to any one of
10 claims 1 to 9 wherein some of said lintel side plates are arranged on one side of the lintel, and at least one lintel side plate is arranged on the other side of said lintel.

12. The framing construction according to any one of
15 claims 1 to 9 wherein the said plurality of lintel side plates are spaced apart from one another to therefore define a space between adjacent lintel side plates.

13. The framing construction according to claim 11
20 wherein said at least one lintel side plate on the other side of said lintel overlaps one of the lintel side plates on said one side of the lintel.

14. A method of forming a lintel in a framing
construction including:
25 constructing a building frame having a top plate and a header plate located above an opening in a constructed frame;

 locating a plurality of separate lintel side
plates, each having a substantially flat plate body,
30 between the top and header plates and connecting the lintel side plates to the top and header plates, so the lintel side plates extend along the lintel between one end of the lintel and the other end of the lintel;

 wherein the top and header plates of the
35 constructed frame comprise the top chord and bottom chord of the formed lintel; and

 locating stiffenings between the top chord and



bottom chord of the lintel.

15. The method of claim 14 wherein at least one
lintel side plate extends beyond an end edge of the bottom
5 chord, the method further including forming vertical studs
in the framing construction with the header plate extending
between the vertical studs, the portion of the lintel side
plate which extends beyond the bottom chord overlapping one
of the vertical studs.

10

16. The method of claim 15 wherein the portion of the
lintel side plate which overlaps one of the vertical studs
includes connection means, and the method further
comprising using the connection means to connect the
15 portion of the lintel side plate to the said one of the
vertical studs.

17. The method of claim 14 or 15 wherein each lintel
side plate has a first grouping of connection elements, and
20 a second grouping of connection elements spaced from the
first grouping of connection elements, and the method
further includes using the first and second groupings of
connection elements to connect the side plates to the top
chord and bottom chord.

25

18. The method of claim 17 wherein the first and
second groupings are located respectively adjacent first
and second opposed sides of the substantially planar plate
body.

30

19. The method of claim 18 wherein the first and
second groupings of connection elements comprise punched
teeth, punched from and extending from the substantially
planar plate body.

35

20. The method of claim 17 wherein the connection
elements comprise holes through the planar plate body for



receiving nails to secure the lintel side plate to the top and bottom chords.

21. The method of any one of claims 14 to 20 wherein
5 all of said lintel side plates are arranged on one side of side lintel.

22. The method of any one of claims 14 to 20 wherein
10 some of said lintel side plates are arranged on one side of the lintel, and at least one lintel side plate is arranged on the other side of said lintel.

23. The method of any one of claims 14 to 22 wherein
15 the said plurality of lintel side plates are spaced apart from one another to therefore define a space between adjacent lintel side plates.

24. The method according to claim 16 wherein the lintel
20 side plates have first and second groupings of connection elements for connecting the lintel side plate to the top chord and bottom chord respectively, and wherein the connection means comprises a continuation of the first and second grouping of connection elements located on a part of
25 the lintel side plate which extends beyond the edge of the bottom chord.

Dated this 11th day of August 1999
MITEK HOLDINGS, INC.

30 By their Patent Attorneys
GRIFFITH HACK

Fellows Institute of Patent and
Trade Mark Attorneys of Australia



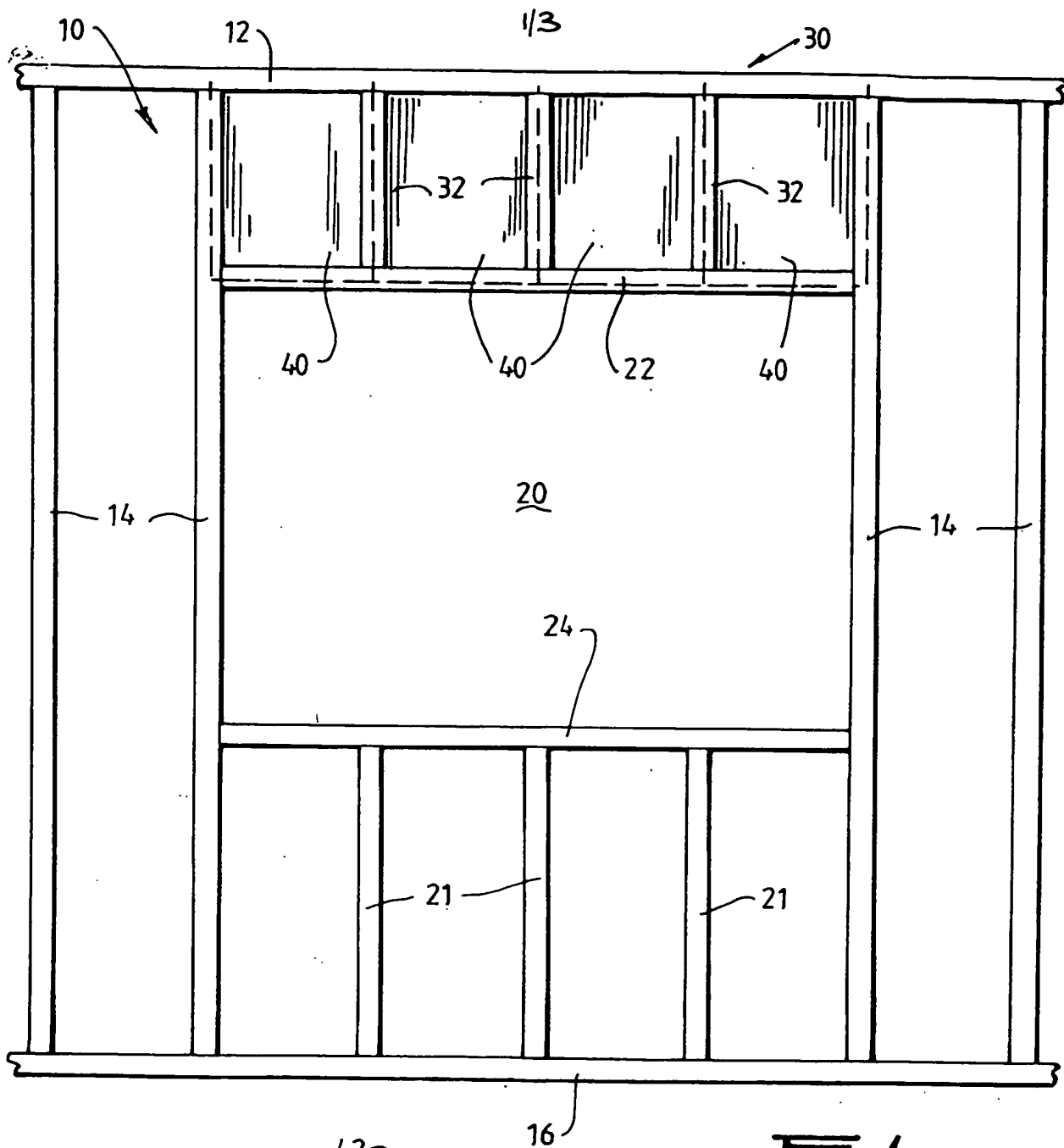


FIG. 1.

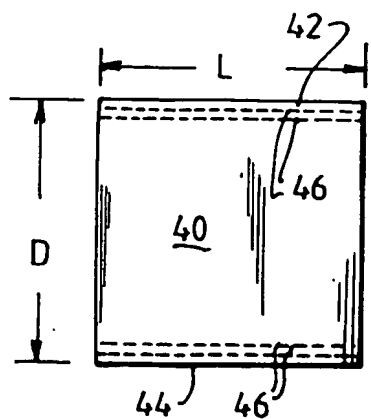
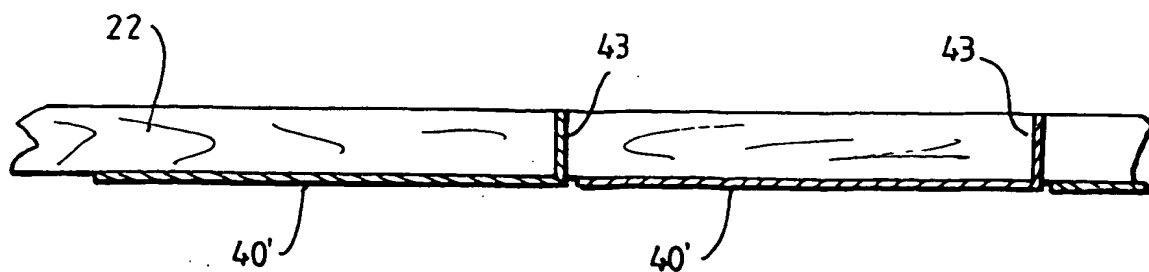
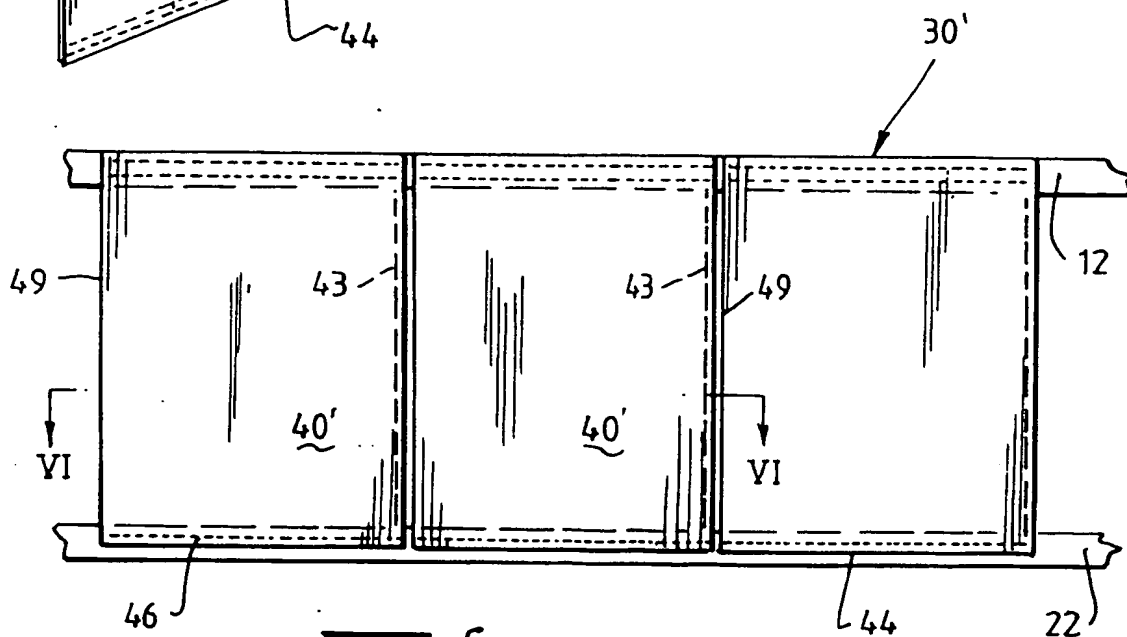
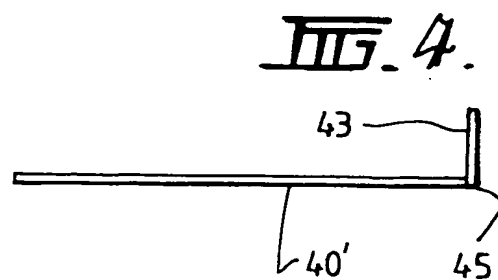
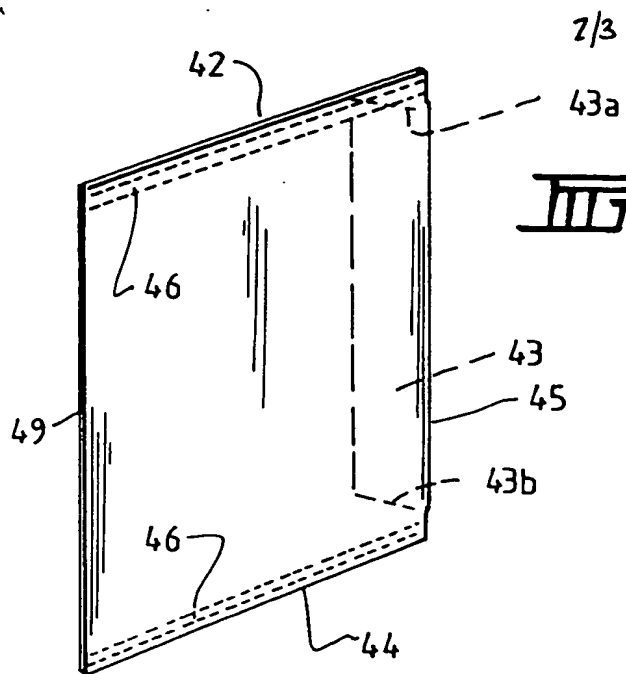


FIG. 2.



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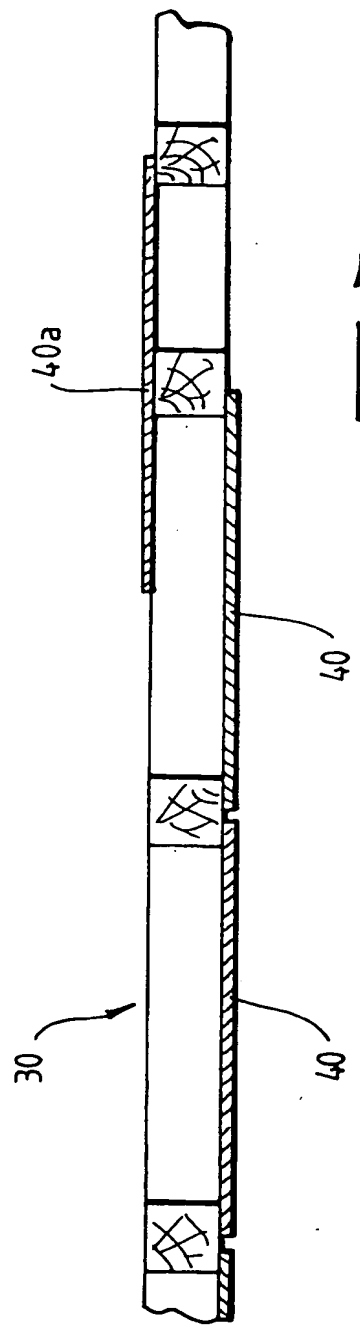


FIG. 7.

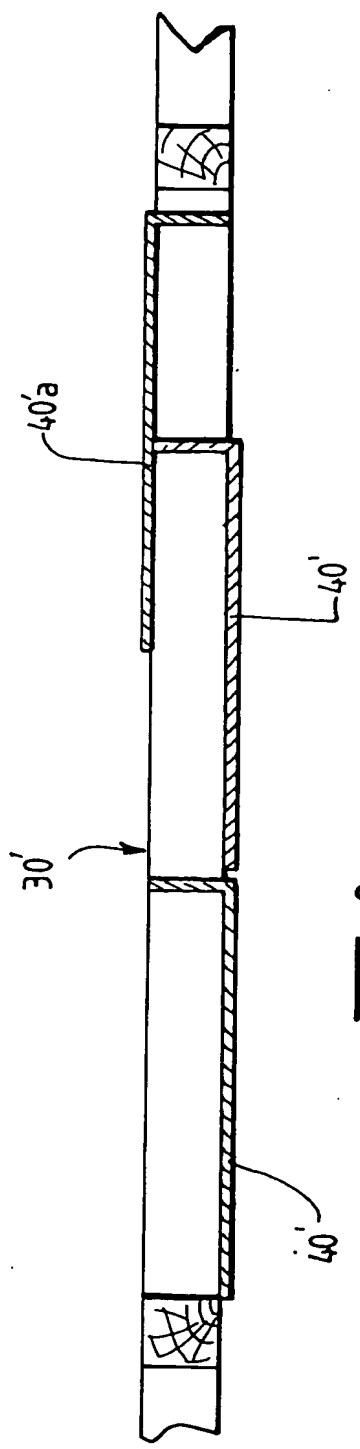


FIG. 8.

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